

Al
Concord

in step 58. The drawing pattern data made up of basic figures undergoes bitmapping processing (step 63). The bitmap data is transferred to a pattern memory in step 64, and output to a beam blanker serving as a beam-ON/OFF means in step 65. Then, an electron beam is ON/OFF-controlled to draw a pattern (step 66). After one stripe is drawn, the drawing step restarts from stripe data read (step 62) for drawing the next stripe. This is repeated to complete drawing of all chips placed on a wafer. --

Please substitute the paragraph beginning at page 3, line 20, and ending on page 4, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

22

-- Fig. 10 is a block diagram showing an electron beam drawing apparatus for drawing a pattern in accordance with data flow (prior art) of the above drawing system. The electron beam drawing apparatus is roughly constituted by an electron beam drawing apparatus main body 280 and a drawing control system 290. The electron beam drawing apparatus main body 280 is comprised of an electron gun 201, convergent lens 202, reduction lens 203, deflector 204, blanker 205, and stage 207. An electron beam EB emitted by the electron gun 201 is converged into 0.1 μm or less via the convergent lens 202 and reduction lens 203 to irradiate a wafer 208 on the stage. The electron beam EB is adjusted in position by the deflector 204 (made up of two, a main deflector 204-1 and a sub-deflector 204-2), and ON/OFF-controlled by the blanker 205. --

Please substitute the paragraph beginning at page 4, line 23, and ending on page 5, line 2, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a3
-- After the bitmap data is transferred to a blanker control unit 220, the electron beam EB is ON/OFF-controlled. In synchronism with this, a deflector control unit 222 settles the beam position, and a stage control unit 223 controls the stage position. A series of drawing operations is performed. --

Please substitute the paragraph beginning at page 6, line 20, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A. ✓

a4
-- Also, in the data transfer step before the start of drawing, a time required to transfer drawing pattern data obtained by data conversion from an external storage device represented by a magnetic disk to a buffer memory unit is prolonged. In the drawing step, a long time is spent on bitmapping drawing pattern data made up of basic figures. --

Please substitute the paragraph beginning at page 7, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A. ✓

a5
-- Recently, there is proposed a method of drawing a pattern by ON/OFF-controlling a plurality of electron beams in parallel with each other using multi-beams. A plurality of electron beams are arranged in m rows \times n columns (m and n are integers of 1 or more), and each electron beam draws a pattern in a basic drawing region, thereby drawing a two-dimensional pattern. This high-speed drawing method also suffers the same problem because the periodicity of design pattern data does not coincide with that of basic drawing regions arranged in m rows \times n columns. This inhibits increasing the speed of the electron beam drawing apparatus. --

Please substitute the paragraph beginning at page 8, line 18, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A. ✓

a6
-- That is, a charged-particle beam drawing data creation method of supplying bit information created from design pattern data in a scanning direction of a charged-particle beam, ON/OFF-controlling the charged-particle beam to irradiate a sample surface, and exposing a two-dimensional pattern by scanning the charged-particle beam comprises the steps of: --

Please substitute the paragraph beginning at page 10, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a7
-- According to still another preferable aspect of the present invention, in the charged-particle beam drawing data creation method, the cell pattern is not less than twice the size of the basic drawing region. --

Please substitute the paragraph beginning at page 10, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a8
-- A charged-particle beam exposure apparatus for supplying bit information created from design pattern data in a scanning direction of a charged-particle beam, ON/OFF-controlling the charged-particle beam to irradiate a sample surface, and exposing a two-dimensional pattern by scanning the charged-particle beam comprises: --

Please substitute the paragraph beginning at page 10, line 26, and ending on page 11, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a9
-- According to one preferable aspect of the present invention, in the charged-particle beam drawing apparatus, the basic drawing region includes all or some of the regions of a plurality of cell patterns. --

Please substitute the paragraph beginning at page 11, line 18, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

alo
-- According to still another preferable aspect of the present invention, in the charged-particle beam drawing apparatus, the cell pattern is not less than twice the size of the basic drawing region. --

Please substitute the paragraph beginning at page 25, line 16, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

all
-- In this case, bitmap data of stripes which can be drawn by one stage scanning is transferred to a pattern memory (A) 118-1. This bitmap data is parallel-transferred to the BAA control unit 121 as signals for ON/OFF-controlling the beam. A pattern is drawn in synchronism with a deflector control unit 122 and a stage control unit 123. While stripe data (A) 118-1 (pattern memory) is drawn, bitmap data of stripe data (B) 118-2 for the next drawing is prepared. Thus, drawing of the stripe data (B) 118-2 can start immediately after the stripe data (A) 118-1 is drawn. --